Production and Formative Evaluation Of a Self-Instructional Module on Application of Adult Learning Principles

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ABSTRACT

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Many personnel trainers and developers of training material are facing difficulties due to their lack of knowledge in relation to adult learning principles and their practical applications wherever training is involved. This is despite the fact that the basic knowledge of these principles and their applications is important to them.

The purpose of the thesis was to design and evaluate a self-instructional training package. The training package consisted of a sound/filmstrip presentation in conjunction with a learner's workbook and an Instructor's Guide which were both in print-based format. It covered the practical application of adult-learning principles. The package was designed to improve the training services offered to Canadian National (CN) employees and to increase the overall awareness of CN instructors and developers of the adult-learning process. A formative evaluation which consisted of three successive phases was conducted in order to evaluate and improve different aspects of the training package. Revisions of the material were based on the results obtained from these phases and consisted of changes

in breakdown of the content, type and wording of the test items, pacing of the presentation, and frequency of summary and review points. Subjects achieved mastery learning of the training material by the the end of the third phase of evaluation of the training package. The results of this study reveal that through continuous selection and utilization of learning and message design principles, and through revision and improvement of the instructional material, mastery learning is achievable by the learners.

" Dedicated to my parents, Parvin and Hassan,
for their unconditional love and affection,
and their infinite devotion to me."

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O ENDLESS ROSE.INTIMATE,WITHOUT LIMIT.
WHICH THE LORD WILL FINALLY SHOW TO MY DEAD EYES.

(J.L. Borges, <u>self-exiled people</u>)

CHAPTER 1

Introduction

Adult learners have become of prime importance and interest to all training and industrial settings in the past few years. Rapid changes in modern industrial and business technology have made it imperative for many adult employees to seek additional training in order to develop new skills, attitudes and knowledge or to refine old ones. Due to these consequential changes, trainers of personnel recognize the importance of providing adequate means to fulfill the needs of their present or potential employees, and are also aware of the need to understand the process of adult learning as well as the training conditions which best promote it. Until recently, learning theories concentrated mainly on children and adolescents and very little information was documented regarding how adults learn (Lanese, 1983). The earlier adult studies focused more on general learning theories and significantly less was reported on adult-learning in industrial training programs. However, the growing interest in adult training promoted educators of adults to reevaluate their adult-learning theories and training practices.

Verner (1964) defines adult education as follows:

> a relationship between an educational agent and a learner in which the agent selects, arranges, and continuously directs a sequence of progressive tasks that provide systematic experiences to achieve learning

for those whose participation is subsidiary and supplemental to a primary productive role in society. (p. 33)

Verner identifies two levels of objectives of adult educators. The first level objectives must originate in the social role of the institution conducting the educational program and deal with its purpose. The second level objectives, however, arise out of special educational needs of the learner as perceived by the institution.

Educationally critical to instructors, and developers of the instructional materials, is the knowledge and understanding of adult training principles and their application. Laird (1982) lists the ability to apply learning theories among the critical skills needed by designers and instructors. (see Figure 1) He believes that, initial training of the development and training officers should enable them to apply learning theories in their lesson plans.

Moker and Noble (cited in Jarvis, 1983, p. 202) note the ability to differentiate between teaching adults as compared to teaching pre-adults, as well as the ability to determine those principles of learning that apply to adults, among the twenty-four different competencies that an adult-educator should possess:

The current approach to teaching application of adult-learning principles is not a very clear one. Trainers of adults (Zemke & Zemke, 1981), seem to be drawing guidance from Roger's and Skinner's behavior-modification/programmed-

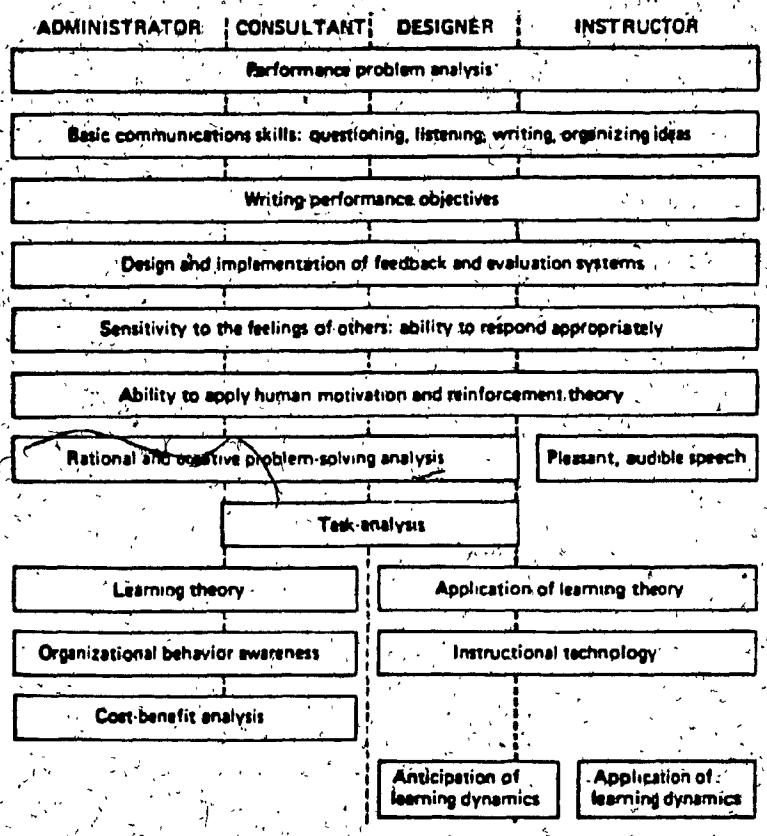


Figure 1. The Critical Skills needed by the Training and Development Officers. (Reprinted from D. Laird.)

instruction and Albert Bandura's behavior-modeling/social-learning school of thought. While both schools of thought have generated research and results, there is still no single theory or set of theories that conveys a thorough understanding of adult learning.

Training departments are applying learning principles in their training programs in varying degrees. Most trainers have an understanding and familiarity with some of the general theories and principles of learning. In most companies, the practice of allowing employees to learn on their own has been replaced by some type of systematic, pre-planned training that incorporates adult learning principles. A survey of trainers is likely to reveal that many have not had much formal training, if any at all, in designing and implementing adult instruction. Most trainers and developers have learned whatever they know about adult learners on the job, despite the fact that adult education has flourished as a specialized field of study for more than fifty years. In training departments, various methods are available for use to impart information and skills. Unfortunately, however, many companies adopt the "one size fits all" approach.

Along with many other Canadian organizations, CN places great importance on personnel training. Many surveys and needs assessments concerned with training and retraining of the developers and instructors have revealed the importance of knowledge of adult-learning principles and their application to the learning processes of adults. Since the

only related training material at CH was an advisor's course covering a classroom technique overview, production of a training package dealing with adult-learning principles was considered necessary.

CHAPTER 2

Educational Context

The instructional package was designed to provide instructors of training programs with a better and broader understanding of application of the adult learning principles. The training material can be used as an instructional tool, as well as reference material. The purpose of this chapter is to describe the development of the training package. It will discuss the instructional design process as well as the related literature.

Goals/Objectives

After studying the instructional material, the learners will achieve the following specific objectives:

1. Define "adult learner" ;
2. State the importance of learner identification to trainers and developers of instructional materials;
3. List and identify common characteristics of all adult learners in training situations;
4. Name the components of "meaningful" learning;
5. Name and discriminate among the three learning domains (i.e., psychomotor, cognitive, and affective);
6. Name and discriminate among the principles of learning (i.e.,recency,accuracy, readiness,effect, exercise, and intensity).

The intended goal of the instructional material was to enable the learners to achieve mastery learning of the module. Mastery learning was defined, by the developer, as

the attainment by the learner of 90% or better on the posttest.

Target Audience

The instructional package is aimed at learners who are described by CN as follows:

1. Usual Occupation : CN Rail Traffic System instructors; Carload Centre clerical; and first-line supervisory staff.
2. New/Temporary: Instructors or subject matter experts (SMEs); developers.
3. CN Service Scale: on average, 17 years (i.e., 5 years 17.7% ; 5-9 years 22.4%; 10-14 years 19.3%; 15-19 years 12.3%; 20-24 years 5.2 %; 25-29 years 6.2%; 30-34 years 8.1%; 35-39 years 4.4%; 40 and more years 4.3%);
4. Education level: on average 12 years (i.e.,6-8 years 4.1%, 9-11 years 34.4 %, 12 years 36.3%, 13-15 years 21.4%, 16-22 years 3.7%);
5. Age: on average 38 years (i.e., 20 years and lower 0.30%;20-29 years 30.2%; 30-39 years 34.1%;40-49 years 16.7%; 50-59 years 14.1%; 60 years and more 4.5%).
6. Language: Anglophone; Francophone; and Allophone with fluency in English;
7. Sex: Both sexes;
8. Knowledge of self-instructional material : Prior exposure to self- instructional materials as users.

9. Writing/reading and organizational skills: Variable,generally poor or underdeveloped.

10. Motivation: Medium to high.

Instructional Design Model

The instructional module is based on Dick and Carey's (1985) systematic or individualized approach model for designing instruction (see Figure 2). After the instructional goal was defined and the entry characteristics of the learners were determined, an instructional analysis of the content of the module was conducted. The instructional analysis method (see Figure 3) is a combinational approach (Dick & Carey, 1985).The learner needs to learn certain parts of the module before the other ones thus,some of the topics should be presented in a specific order (e.g., "adult" learner is defined before common characteristics of adults are listed and identified.).

The instructional analysis of the content of the module produced objectives which are basically related to teaching knowledge,rather than skills (i.e., the objectives are concerned with the information stored in the learner's mind, rather than the learner's actions or performance).The content of the module deals with both subcategories of knowledge (Romiszowski, 1984): factual and conceptual information (see Table 1). The factual information included in the module either states the facts and describes events (in verbal or symbolic manner),or discriminates procedurally) between similar information. The type of

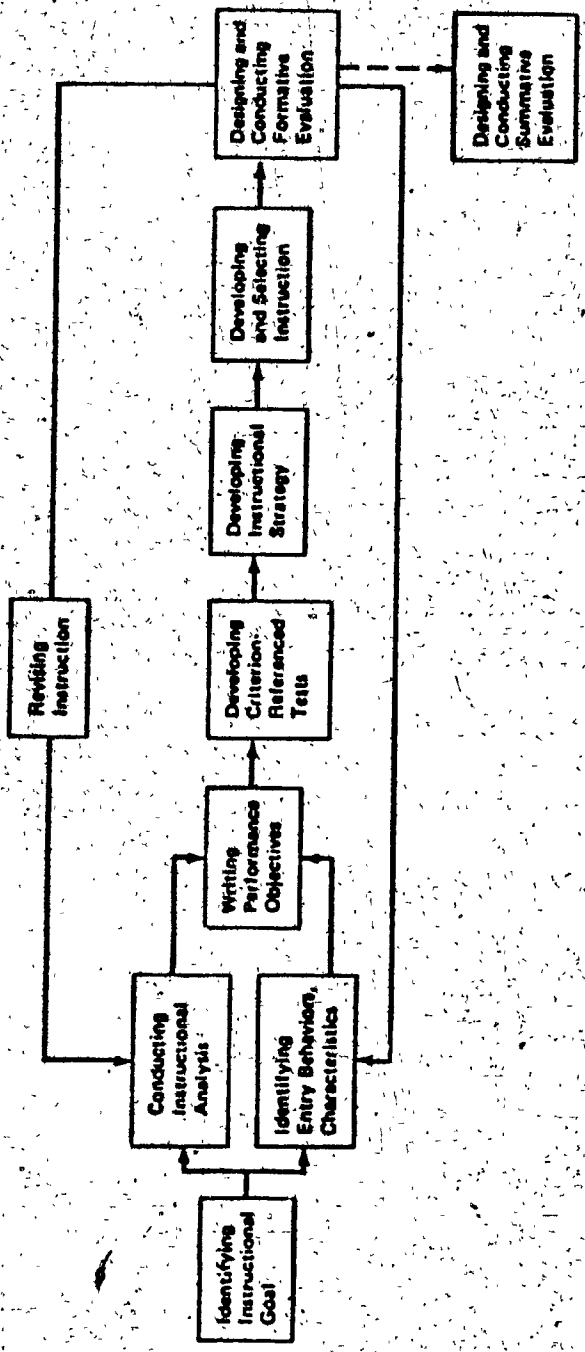


Figure 2. System Approach Model for Designing Instruction. (Reprinted from W.Dick and L. Carey.)

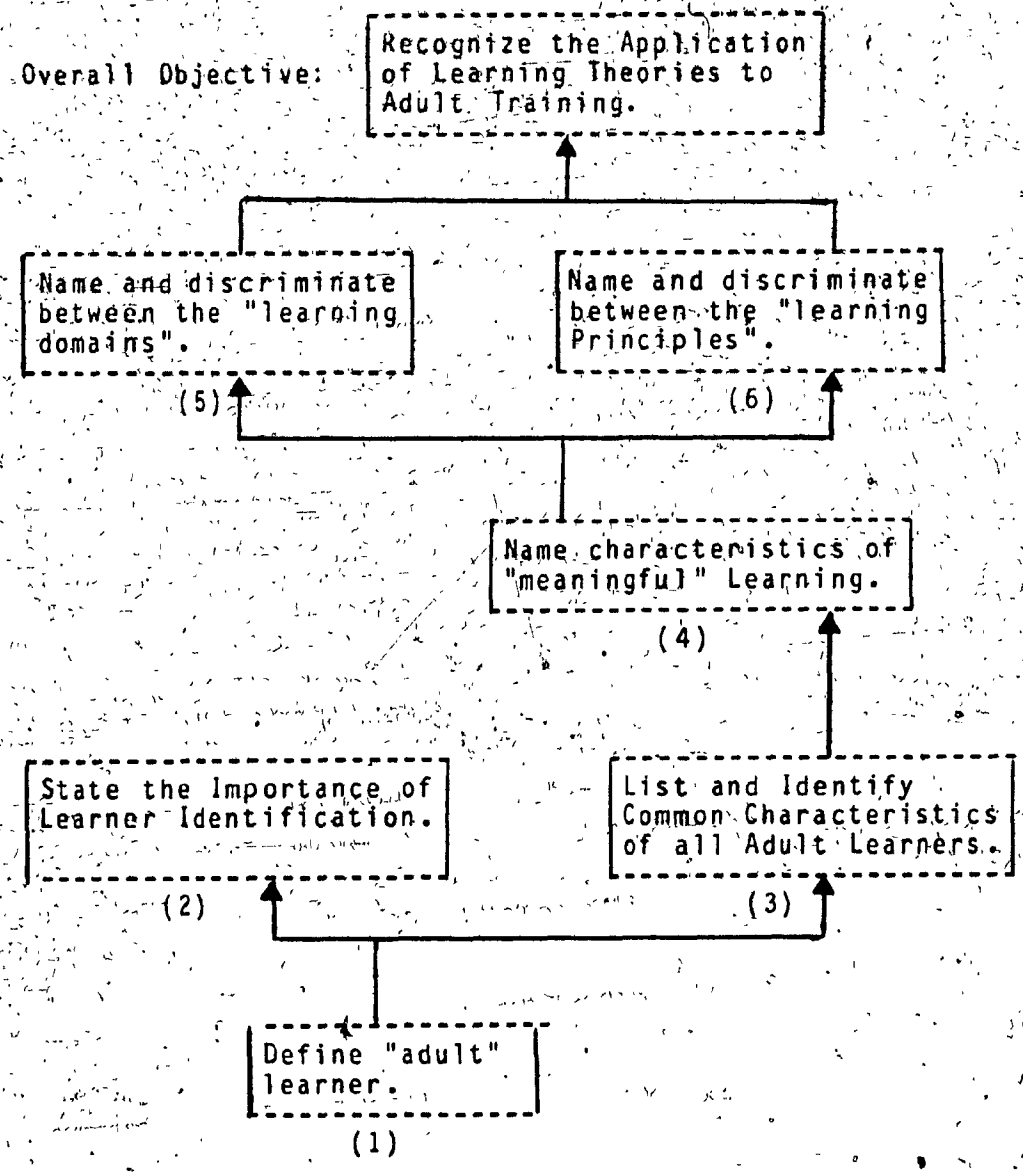


Figure 3. Instructional Analysis on Application of Learning Principles.

Table 1

Instructional Plan for the Training Module on Application of Learning Principles

Instructional Objective	Evaluation	Skill/Knowledge
Define "adult" learner.	True/False Short answer Fill-in-the-blanks	Factual Procedural
State the importances of learner identification identification.	Short answer Fill-in-the-blanks	Factual
List & identify common characteristics of all adult learners.	True/False Short answer Fill-in-the-blanks	Factual Procedural
Name the components of meaningful learning.	Short answer Fill-in-the-blanks	Factual
Name and discriminate between the learning domains.	Short-answer Fill-in-the-blanks Matching	Factual Procedural
Name and discriminate between the learning principles.	Short answer Fill-in-the-blanks Matching	Factual Procedural

Note. The overall instructional strategy was expositive.

conceptual information presented in the module deals with recall only (see Table 1).

The next two steps in implementing the model were: developing criterion referenced test items and the instructional strategy for each one of the instructional objectives (see Table 1). The overall strategy of instruction is expositive, (Romiszowski, 1984) since the learners are involved in reception learning rather than discovery learning. The following steps of the expositive strategy were implemented: (a) presentation of information through explanation and practical demonstration (i.e., sound/filmstrip); (b) testing for the reception, recall and understanding (i.e., embedded tests); (c) repetition or rephrasing of the message if it proves to be necessary (i.e., summary and review sections), and ; (d) presenting learners with opportunities to practice applying the general knowledge learned to a range of situations or examples, and testing for correct applications (i.e., posttest) (see Figure 4).

The Dick and Carey model suggests that formative evaluation be done in three sequential stages of learner try-out and revisions involving (a) one-to-one evaluation; (b) small-group evaluation ,and; (c) field-test. The formative evaluation approach which was implemented for the training package differed from that of Dick and Carey. The developmental testing of the training material was conducted in three different cycles (Figure 5). The procedures of the testing will be discussed in detail in

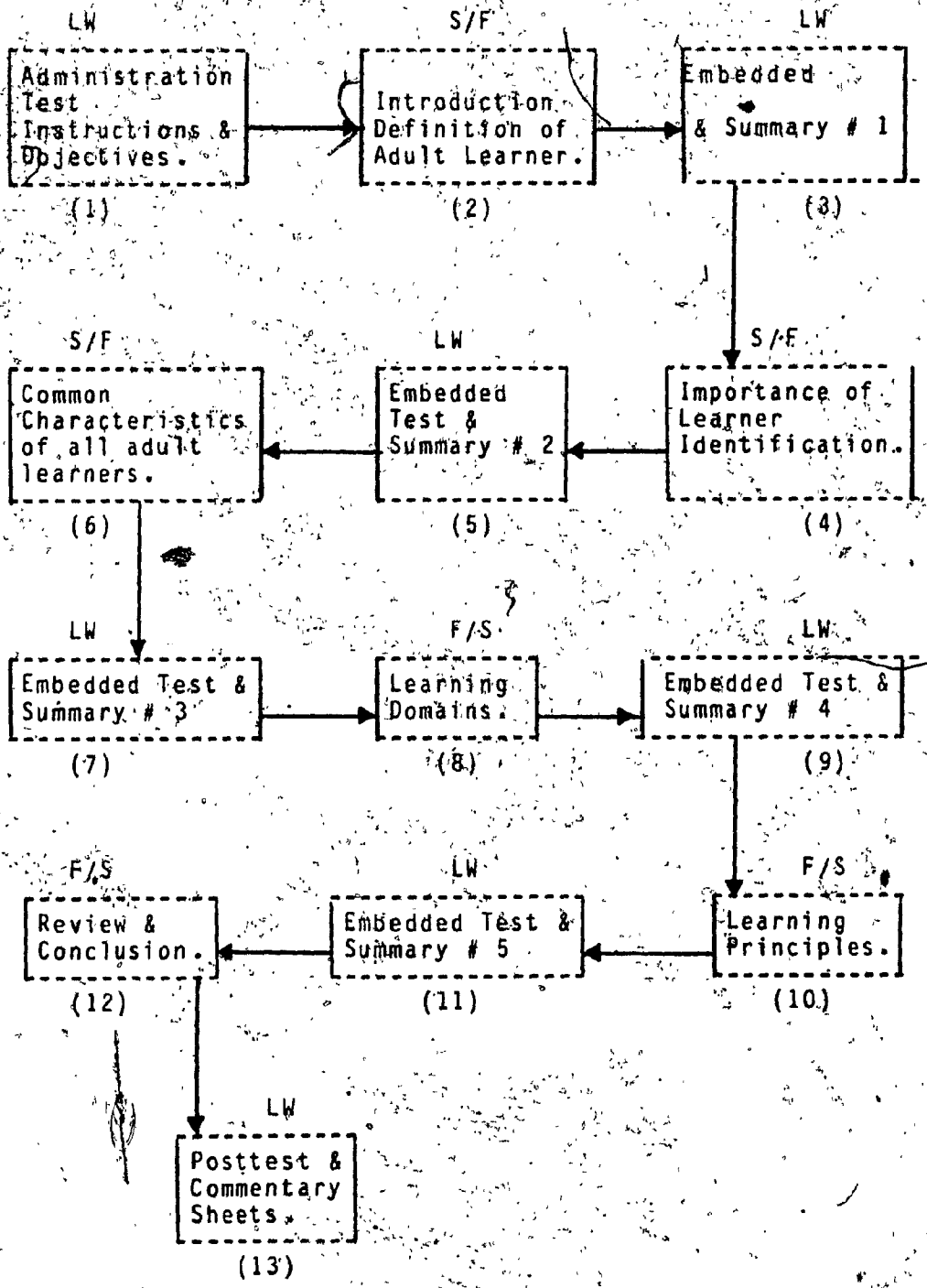


Figure 4. Instructional Events (S/F = sound/filmstrip and LW=learner workbook).

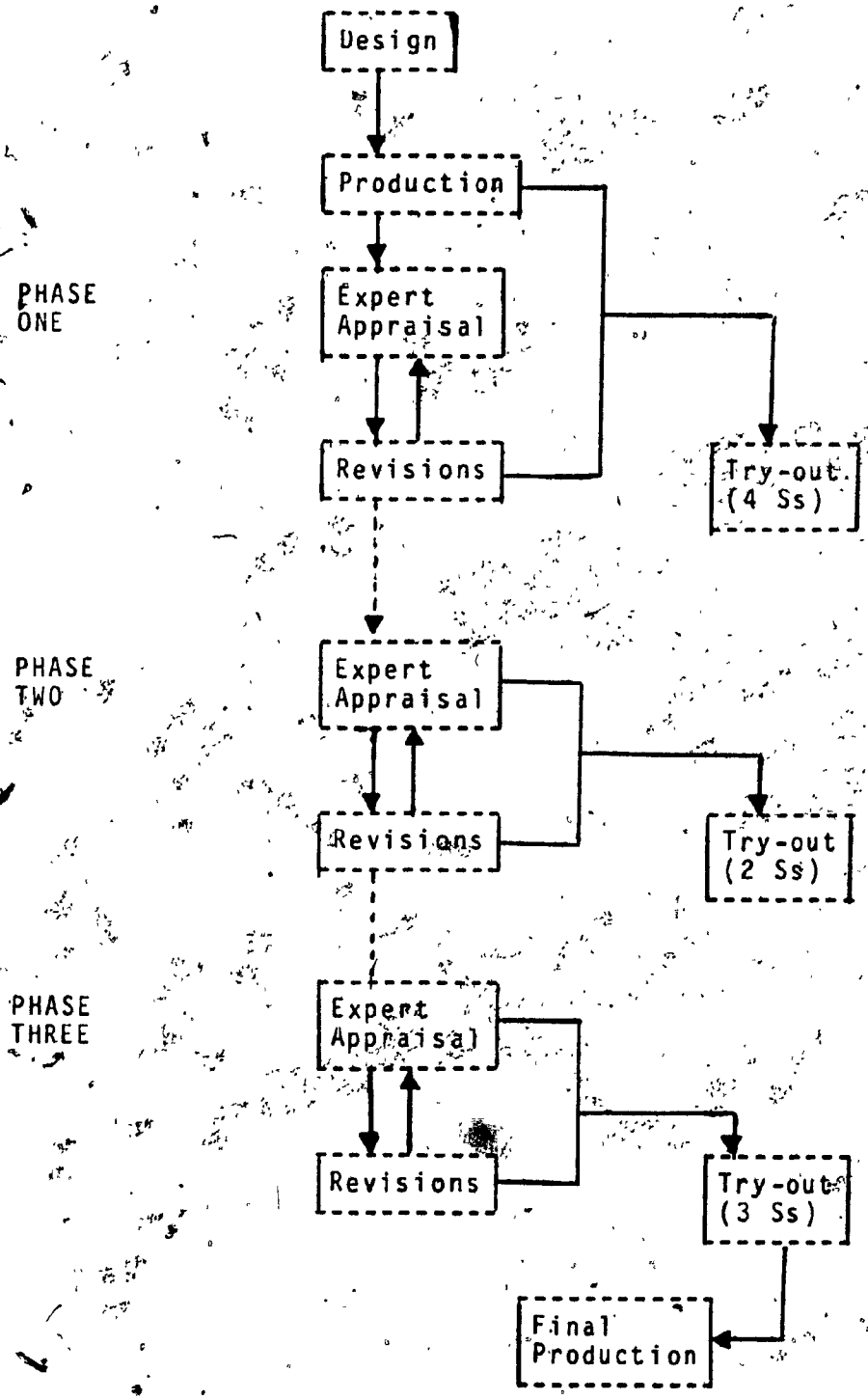


Figure 5. Three Phases of Formative Evaluation.

in the next chapter.

The last step of the Dick and Carey model, which involves designing and conducting a summative evaluation, was not implemented for the training package. The summative evaluation was not carried out due to practical limitations concerning finances, personnel, time and facilities. Learners achieved mastery learning by the end of the third revision and the instructional materials were submitted for final production (see Figure 5).

Outline of the Content and Form of Presentation

The module consists of a 98 frame filmstrip with a synchronized audio cassette format and two booklets (a learner's workbook and an instructor's guide). The sound/filmstrip presents the following areas in basic application of adult-learning theories: (a) definition of "adult learner"; (b) the importance of learner identification to trainers and developers of instructional material; (c) common characteristics of all adult learners; (d) meaningful learning; (e) three learning domains, and; (f) the principles of learning(see Figure 4).The accompanying learner's workbook contains the objectives of the module, the administration instructions, a commentary sheet and the tests (pre-, post-, and embedded), as well as summary and review sections. The instructor's guide includes the associated administration instructions and a marking guide. (A copy of the sound/filmstrip script may be found in Appendix A. A copy of the learner's workbook may be found in Appendix B. A copy of the Instructor's

Guide may be found in Appendix C).

Rational for Content Selection

The two main criteria considered in the selection of the content were: (a) The content should be general enough to be relevant to both groups of learners who were instructors and developers, and (b) the content only deals with the most practical and applicable knowledge learners need to acquire for on the job situations. After discussions were held with the CN training team, the content of the module was finalized.

Defining the adult learner. The meaning of the term "adult" is very vague, particularly when it is used to identify the clientele of adult education. The definition of who is an adult varies from "those past school age" through "grown ups" to "mature individuals". Such descriptions are so indefinite as to be all but meaningless. Verner (1964) names the categories of age, psychological maturity and social roles as the criteria in attempting to arrive at a precise identification of an adult. According to the author, age is an inadequate criterion for determining which individuals need to benefit from adult education, since it is subject to too many variations. Psychological maturity would be a more functional criterion, if it was ascertainable and had more practical applications. The social role, however, provides a functional basis for determining adult status: "This shift in roles - particularly of the learner from a primary to a subsidiary place is the significant element that

differentiates an adult from a pre-adult" (p.29). Verner defines an adult as being:

> a person who has come into that stage of life in which he has assumed responsibility for himself and usually for others, and who has concomitantly accepted a functionally productive role in his community. (p. 29)

This definition conveys the character of adult education, identifies the corresponding functions which adult education should perform, and sets the boundaries for research into the changing patterns of responsibility in adult life.

The importance of learner identification. Learner identification is very important to instructors and developers of the instructional materials, for several reasons. The problem of overestimating or underestimating the ability of the learners is still of great concern today and probably will be for a number of years. It is a matter of fact that some instructional designers are far removed either by age or socioeconomic status from the learners whom they hope to serve through instructional materials. Therefore, the designer must make a conscientious effort to identify the critical characteristics of trainees, in order to design appropriate instructional material.

Adult learners have many individual differences. These differences can be dealt with in categories of learning styles, goals and background (Lanese, 1983). It is only after individual differences among adult learners are identified and analyzed that training programs that use

different training methods to meet these differences can be implemented.

One way to accommodate such differences is to determine various methods that will be effective in delivering information and skills. These methods should account for differences in learning styles, goals and background. Grabowski (1980) states that:

> the implication of the differing ability of adults and the rate of learning for training is that no single method or technique of instruction will effectively reach all learners. Many trainees have one or more favorite approaches to training and are satisfied with such limited approaches. (p. 15)

Learner identification enables one to select the most suitable and most effective training methods for the learners. One may find increased positive responses to one's training approach and programs because of recognizing the individual. In addition, learner identification will help one in verifying whether or not a certain training program is suitable to the trainee who is utilizing it. This could be done by comparing the learner's characteristics revealed through learner identification to the description of learners that the training program is aiming for.

Common characteristics of adult learners. From a variety of sources (e.g., instructor's experience with trainees and research) emerges a body of fairly reliable knowledge about common characteristics of all adult

learners.One of the common characteristics of adult learners is their resistance to learning. Many who have struggled with the problems of adult instruction would claim that the adult's resistance to learning is the chief difficulty they encounter in their role as practitioners . Adults resist learning because:

1. Much adult learning is overlearning, that is relearning what they already know;
2. Learning involves risks;
3. Learning requires changes and adults dislike giving up their emotional investments in the behavior which new learning would compel them to change;
4. The objective elements of new learning may actually conflict with or run counter to old ones (e.g., in the case of mechanical skills, different languages and, revised administrative structure) (Verner,1964).

Zemke and Zemke (1981) state that "information that conflicts sharply with what is already held to be true, and thus forces a re-evaluation of the old material, is integrated more slowly" (p.46).

Resistance to learning,however, could be overcomed by making learning as meaningful to the adult learner, as possible. Meaningful learning aids the learner in organizing new information and relating it to previously stored knowledge. To be meaningful, learning should deal with the experience and goals of the learners (Verner,1964;

Grabowski,1980 ; Bedient & Rosenberg, 1980; Lanese, 1983). Training programs can use work experience to promote successful learning.For most adults,learning is a means to an end, and not an end in itself. To be most meaningful, learning should be aimed at helping the learner move toward the attainment of his or her goals.

Learning domains. The work of prominent psychologists (Bloom, Englehard, Furst, Will, & Krathwohl, 1956;Krathwohl, Bloom,& Masia, 1967; Harrow, 1972) has set the division of learning objectives into three domains: cognitive,affective and psychomotor. The cognitive domain is concerned with intellectual knowledge, skills of reasoning and problem-solving along with the other mental abilities. The affective domain concerns the learner's feelings, attitudes, and interests. The psychomotor domain deals with skills involving physical coordination and manual dexterity (Romiszowski, 1984).

Learning principles. The principles of learning are discussed in the last section of the module. Although these principles are given different names by different educators they are all used as practical guidelines in many instructional processes. The learning principles consist of the principles of effect, exercise, accuracy, recency, readiness and intensity.

The principle of effect (Thorndike, 1913, 1933) states that learning is highly dependent on its consequences. This implies that, learning is more efficient and more lasting where consequences for the learner are informative, tension

reducing, useful, instrumental, pleasant, interesting or rewarding.

The principle of exercise (Thorndike, 1913, 1931) is an old and well-worn truism, "practice makes perfect". This principle states that things most often repeated are best remembered.

The principle of accuracy suggests that the learner should be guided to learn the correct way the first time around. In general, informing the learner of errors and then providing the learner with the correct responses facilitates learning. Also, it is desirable to reinforce all correct responses during the initial learning (Anderson, Faust, 1973).

The principle of recency as stated by Berelson and Steiner (1964) suggests that the learner remembers things most recently learned the best. This is due to superior learning of last or more recent material.

The principle of readiness (Thorndike, 1913, 1931, 1932) or predisposition to learn explains that a person learns best when he or she is ready, motivated and willing to learn.

And, finally, the principle of intensity recognizes that we learn more from realistic simulations than from abstract examples. In general, transfer or generalization is facilitated where the learning situation resembles the testing or application situations or where the learning is practiced in various "realistic" contexts or simulations (Anderson & Faust, 1973).

Rationale for Media Selection

Several factors were taken into consideration in selecting the instructional media ,such as: (a) the type of learning involved; (b) the projected availability of media in the environment in which it would be used; (c) the ability of the designer to produce materials in a particular format, or the availability of persons with the required expertise, and; (d) the flexibility, durability, and convenience of materials within a specialized medium,along with the cost-effectiveness of that medium, compared to others. The following sections deal with all the factors mentioned above under the two general categories of practical and instructional considerations:

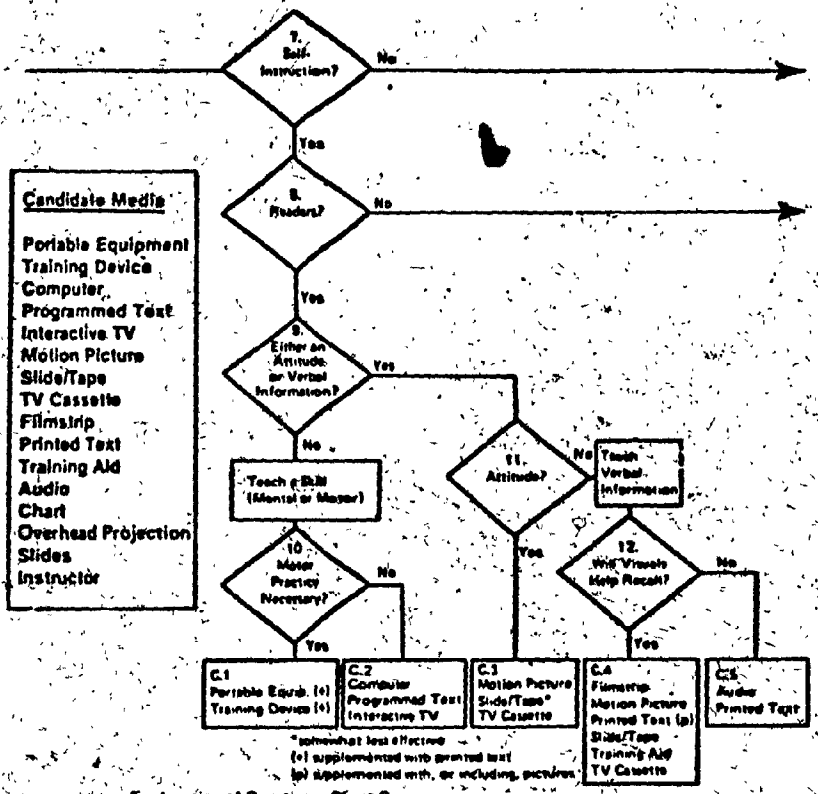
Instructional considerations. The appropriateness of the type of instructional media selected was examined and justified andragogically. The characteristics of the training content play an important role in selecting the type of media. Filmstrips can be used to teach recognition and/or discrimination. They can also be used to teach rules, principles, and the sequence of events. In addition, the versatility of the display design allows for progressive disclosure of information which is accompanied by the suggestion of motion, and special effects through photography, artwork, and graphics. The sound is used to add variety to the training and ensure exact content and instructions (Anderson, 1976).

Print-based material can be used to teach verbal information, concepts and rules to competent readers

(Reiser & Gagne, 1983). However, since the majority of learners participating in this training have poor or underdeveloped writing/reading organizing skills, the effectiveness of print will be surpassed by a medium which has the capacity for visual display. As a result, the sound/filmstrip is the main medium of instruction.

The sound/filmstrip and print based material can be effectively used on a self-instructional basis since it allows for (a) self-paced learning; and, (b) immediate feedback as well as reinforcement (Reiser & Gagne, 1983). The information covered in the training material is mostly verbal information (see Figure 6) and the aim is to enable the learners to "state", rather than to "do", something. The use of visuals in the presentation will enable learners to establish images that could aid in recall of the verbal information (see Figure 6).

The literature reveals several studies where the effects of adult learning from films and sound/filmstrips were compared to those from conventional ways of instruction. In general, many studies revealed significant learning increases when instructional films or sound/filmstrips were used as media of instruction compared to situations in which films were not used (Rulon, 1933; Wise, 1939; Van de Meer, 1945; Hovland & Lumsdaine & Scheffield, 1949; Neu, 1951; DWorkin & Holden, 1960; Ash & Carlson, 1961; Gagne & Gropper, 1965). In a recent meta-analysis of media's influence on learning, Clark (1983) concluded that media do not influence learning under any



Explanation of Questions - Chart C

7. Self-Instruction? Are students expected to learn by self-instruction, without an instructor?
8. Readers? Can the students, with reasonable efficiency, gain information from printed text?
9. Either an Attitude or Verbal Information? Is the aim either to influence the student's values (attitudes) or to have the student learn to 'state' (rather than 'do') something?
10. Motor Practice Necessary? Does the skill to be learned require smooth timing of muscular movements (a "motor skill")?
11. Attitude? Does instruction aim to influence the student's values or opinions?
12. Will Visuals Help Recall? Is it likely that the use of visuals will help the student establish images that will aid recall of verbal information?

Figure 6. Flowchart Panel applicable to the instructional situation "self-instructional with readers". (Reprinted from R.A. Reiser & Gagne.)

conditions. Clark states that in most of the studies comparing different media of instruction " media are mere conveyances for the treatments being examined and are not the focus of study, though the results are often mistakenly interpreted as suggesting benefits for various media" (p.446). Media comparison studies that find casual connections between media and achievement Clark claims, are basically confounded. This is so, Clark claims, since uncontrolled effects of instructional methods or content differences between treatments are compared. Also contributing, is the novel effect for newer media which tends to disappear over time.

To summarize, the literature on audio-visual materials used in training is lacking recent appraisal or research evaluations of these materials. Some studies indicate overall higher learning effects achieved as the result of instruction by media compared to conventional instruction. Some recent meta-analyses of media influence on learning, however, attribute these learning gains to other factors such as the differences in instructional methods rather than media.

Practical considerations. The effectiveness of any instructional material as a teaching tool is highly dependent on its practicality in terms of production, distribution and utilization. For many years, CN has been considering the sound/filmstrip as the best and therefore the preferred medium of instruction. Due to the increasing use of individualized instruction and more frequent

situations requiring distribution of programmed packages to large trainee populations, there is also a markedly increased usage of sound/filmstrip throughout educational and training situations. In addition, a large number of tape recorders and filmstrip projectors are available at all CN training centers, making this a media of high availability. Among the inherent advantages of the sound/filmstrip are : (a) Their compact size, which permits convenience in packaging and storing, ease of distribution and convenient transportation for use in various locations; (b) They are easily and exactly reproducible in large quantities, and; (c) They provide locked-in visual/auditory content and sequence which, ensures both lesson integrity and protection against content being lost, reversed, or placed out of sequence (Anderson, 1976).

In spite of the recent public fascination with new electronic media, there are still good reasons to believe that printed materials will always have an important role in training and education. CN has always considered print-based materials to be efficient and practical training media. Among inherent advantages of print-based material are (Anderson, 1976) : (a) Print in its many forms can be sent to remote locations and can be used by individuals on a self-instructional basis; and, (b) Print-based materials can be easily retained and resequenced. The print-based materials of the training consisted of the instructor's guide and the learners's workbook which accompanied the sound/filmstrip.

Production Design

Format. The format of the module is self-paced individualized instruction (Gagne & Briggs, 1974). In this format the learner works at his/her own rate and achieves objectives set by the course which are required of all learners. All students may use the same materials to reach the same objectives; however, the rate of progress is individualized.

Self-instructional formats are favored by the majority of adult learners. In a survey done by Zemke & Zemke (1981) adult learners indicated their preference for self-directed learning projects 88% of the time over group-learning led by professionals. Similarly, the need to control pace and start/stop time strongly affects the self-directed preferences. Lanese (1983) indicates that companies dealing with more technical information and skills, such as engineering, computers, and science, utilize highly structured self-instructional approaches.

In individualized instruction the instructor plays the role of faciliator and provides less of the instructional events than the material itself. As a result, the instructor is capable of doing more personalized work with the learners by monitoring their progress more closely, and is able to diagnosize and alleviatize their difficulties through remedial teaching. Furthermore, the learning period is allowed to vary, and the learners are able to work on their free time (Gagne & Briggs, 1974).

At CN the self-instructional format has been widely

implemented with great success. For example, self-instructional English units utilized by CN trainees had an overall success rate of 94.6%, modified average gain of 87.4% and failure rate of only 3.5% by June, 1984 [Overall Success Rate = mastery achievement; Modified Average = (posttest-pretest)/ Possible Gain; Possible Gain =(maximum score - pretest)].

Message design. Several principles of message design are incorporated in the production design of the module. Since the training material is self-instructional, the learner is able to initiate and terminate the presentation at any time. The learner also has the opportunity to interact further with the material through self-evaluation and self-correction. In general, " where the learner reacts to or interacts with the criterial S, learning is facilitated, and that facilitation increase with the degree of of activity or involvement" (Fleming & Levie, 1978, p.138).

The instructional content of the module is presented in an organized manner. Usually, "the better organized or patterned a message is perceived to be, the more information we can receive (and process) at one time" (Fleming & Levie,1978, p. 56). Within the module, the content is divided into different sections which are numbered. Each of these sections begins with an introduction to the content of that section. This is followed by the presentation of the content.This section terminate with a summary and feedback. The entire content of the module, which was introduced at

the beginning of the presentation, is summarized at the end of the module as well.

The instructional package provides the learner with numerous opportunities for practice.In general, " practice in varied contexts can both increase retention of learning and extend its range of utility" (Fleming & Levie, 1978, p. 150). The instructional material , in addition to a pre- and posttest, contains embedded tests at the end of all teaching points, since "spaced or distributed practice, in general, results in greater learning than massed practice" (Fleming & Levie, 1978, p. 126). Each embedded test not only asks questions about what was covered in that teaching point, but also tests the learner on the previous section's of the instruction. Within the module, all the tests are followed immediately by correct answers and appropriate feedback since "informing the learner of errors, increases learning over not informing, and then providing the learner with the correct response is additionally facilitative" (Fleming & Levie, 1974, pp. 119-120).

Great emphasis is given to the type and conditions of testing. Often, " learning as a measurable entity varies not only as a function of the conditions during acquisition..., but also as a function of conditions of testing or application" (Fleming & Levie, 1978, p. 104). They also state that "the modality used in the final testing or application situation should be the modality employed during instruction" (1978, p.106). The type of test items which are used in the embedded test as well as, the

conditions under which the testing takes place, are identical to those used for the pre- and posttests.

Furthermore, " learning that is meaningful to the learner is acquired more readily and is retained longer than that which appears meaningless or arbitrary to the learner" (Fleming & Levie ,1978, pp. 98-99). The instructional content is meaningful to the learner, since it makes reference to, and gives examples of, the learner's real-life and everyday-work situations. The instructional material is presented in a simple and conversational language to which the learners can easily relate.

CHAPTER 3

Method

Objectives of Evaluation

The purpose of the evaluation was to collect information from both the Subject Matter Experts (SMEs) and the potential users of the training material, in order to improve the quality of the training package. The final training material was expected to meet the criterion of all learners achieving mastery learning of the content. The objectives of the formative evaluation were:

1. To determine whether users of the training package reached mastery learning (mastery learning was defined as learners attaining 90% or more on the posttest);
2. To evaluate message design, content and production aspects of the training package.

The formative evaluation was conducted in three successive phases. Each phase involved a new group of subjects who were evaluated on a one-to-one basis.

Sample

The sample consisted of a total number of nine subjects, all employed at the CN Training Center in Montreal, Quebec.

Phase one of the evaluation involved three senior clerks and one supervisory assistant. One project developer and one senior clerk constituted the subjects of the second phase of the evaluation. For phase three of the evaluation, subjects consisted of two senior clerks and one junior

clerk. All the subjects had prior exposure to self-instructional material as users, but did not have prior training in any aspects of the instructional contet. The subjects were English speaking males and females ranging in age from 22 to 38 years. Participation in the evaluation was on a voluntary basis.

Instrumentation

Pre- and Posttest. The final pre- and posttests comprised of nine items including matching, fill-in-the-blank, and short-answer question (see Appendix B). The fill-in-the- blank and short-answer questions were worded in such a way that subjects were required to write a specific answer, one that was previously agreed upon, to be correct. The purpose of the pretest was to determine whether the learners were able to participate in the evaluation. Subjects were selected for evaluation if they scored 30% or less on the pretest. The posttest however, was administered to evaluate the learner's comprehension and retention of the training module and to test for the achievement of mastery learning.

Learner Data Sheet. The Learner Data Sheet was given to the learner along with the pretest. This data sheet was administered to the learner to seek information pertaining to employment history, CN service date, present position at the company, educational background, and other related personal information (see Appendix B).

Learner's Questionnaire. The learner's assessment of the training material was obtained through a Learner's

Questionnaire which is termed "Reactionnaire" at CN. The learner's questionnaire comprised 24 multiple-choice items in which the learner chose each response from a five point scale ranging from "strongly agree" to "strongly disagree". The last item of the questionnaire asked for any other suggestions the learner might have about the training material (see Appendix B).

Validator's Observer Sheet. The Validator's Observer Sheet was used by the evaluator to record information on the learner's behavior and reactions during the one-to-one evaluation (see Appendix B).

Expert Appraisal Report. Several expert appraisals of the training material were performed by the CN Expert Team during the course of formative evaluation. These reports contained comments and feedback on design, production, and administrative aspects of the training package.

Evaluation Design

Formative evaluation of instructional materials are done using many different approaches. Earlier studies (Rosen, 1968; Kandaswamy, Stolovitch & Thiagrajan, 1976; and Wager, 1983) have all suggested that any kind of formative evaluation improved the effectiveness of instructional materials in general, and that no method of gathering student feedback was superior to another one for the purpose of formative evaluation.

Weston (1986) describes several approaches to formative evaluation such as the three stage model (Dick & Carey, 1985), developmental testing (Henderson & Nathenson, 1976),

expert review (Montague, Ellis & Wulfeck, 1983) and learner verification and revision (Komoski & Woodword, 1985). The evaluation approach taken here was a combination of the developmental testing and the expert review. The developmental testing approach is similar to the three stage model (Dick & Carey, 1985) in that it requires that the learner be used as the primary source of feedback for revision. It differs from the three stage model in that it requires a test-revise-test-revise cycle with any number of subjects rather than the systematic and consecutive process of one-to-one, small group and field-test evaluations which are carried on in the three stage model (Horn, 1964). The study favored the developmental approach in order to increase the frequency of the test-revise cycles. Formative evaluation of the training material was conducted in three different cycles (see Figure 5, p. 14).

The design of the formative evaluation was a one-group pretest/posttest (Cohen & Manion, 1981) design. The one group pretest/posttest design for each phase is presented as:

	Pretest	Training	Posttest
Phase One	01	X	02
Phase Two	01	X	02
Phase Three	01	X	02

The purpose of the pretest was to determine whether the subjects were able to take part in the evaluation process. The posttest was administrated to find if mastery learning

was achieved by the learners.

Procedure

General. Each evaluation took place during regular office time. Each subject underwent evaluation in the same conference room located in the training department. The environmental conditions were made as comfortable as possible by adjusting the room temperature, lighting and seating arrangements according to the subject's preference. The door was kept closed at all times and the subject was allowed to smoke if he/she desired to do so.

The formative evaluation was conducted in three successive phases (see Figure 5). Phase one was conducted approximately two months prior to phases two and three. This phase began immediately after terminating the design and production of the training materials. These materials were appraised by the experts (i.e., the CN Training Team) before being tested on the first subject. One-to-one evaluations at this stage revealed that mastery learning had not been achieved by the learners.

Phase two began with the expert appraisal and was followed by revisions made in the training materials (see Figure 5). The training materials then were tested on the second group of subjects. Since mastery learning was not achieved at this stage, the material was forwarded again for expert appraisal and revisions.

In phase three of the evaluation revisions were made once again based on the feedback received from the learners' performance and expert appraisal. The training material was

subsequently administered to a new set of subjects. At this time, it was determined that mastery learning had been achieved by the learners. The training package was therefore sent for final production.

One-to-one evaluation. One-to-one evaluation was implemented to obtain maximum feedback and in-depth information about the subjects interacting with the training material. Weston (1986) explains the process of one-to-one testing as one in which:

> an individual student works through draft or prototype materials with a developer. It is at this stage that major instructional problems are usually identified resulting in revisions such as a change in the instructional strategy or overall change in the organization of the instruction. (p.8)

Each one-to-one evaluation began with the evaluator providing a brief introduction to the purpose of the study. The subject was advised at this time of complete anonymity in the experiment (the subject was identified by an assigned number rather than the his or her real name). Since the format of the training material was self-instructional, the subject was asked to work on his or her own as much as possible and to seek assistance only if the instructions were unclear. At this point, the training package was handed to the subject. The pretest was administered to the subject by the evaluator who was present in the room at all times. From this point on, the evaluator quietly observed and documented the subject's behavior on the Validator's

Observer Sheet.

After the pretest was completed by the subject, it was collected by the researcher and the subject commenced the presentation. Following the instructions given in the material, the subject proceeded to complete the task. As a final step to the sequence, the posttest was administrated. The evaluator subsequently collected the posttest along with the anonymous Learner's Questionnaire. At this point the subject took a short break while the evaluator corrected the pre- and posttest and reviewed the learner's reactionnaire. At the end of this period, the subject was informed of the results of his or her tests and was invited to add any further comments or questions he or she might have had in relation to the training. The subject was then thanked for his or her participation in the study.

Data Analysis

Scores from pretests were obtained to determine whether the subjects were suitable to participate in the evaluation of training material. Scores from the posttests determined whether mastery learning was attained by the learners. Results of the Test Learner Data Sheet and the Advisor's Report on self-instructional material provided information pertaining to the learner's background and present status. Results of the Learner's Questionnaire, the Validator's Observer Sheet and the Expert Appraisal Report were obtained to provide comments and feedback on design, production and administrative aspects of the package.

CHAPTER 4

Results and Discussion

The study produced and evaluated a training package. The training materials were formatively evaluated in three successive phases. The evaluations were conducted to determine the achievement of mastery learning by the learners.

The revisions of the training materials were based on results obtained from the posttest, comments made by the learners on the Learner's Questionnaire, and the observations of the evaluator as well as the Expert Appraisal Reports.

Phase One

Results

Pre- and Posttests. The results of pretest and posttests were tabulated (see Table 2). The pretest scores determined that all the subjects were able to participate in the evaluation of the training package. The posttest results revealed that none of the subjects achieved mastery learning.

Posttest scores were analyzed per objective (see Table 3). The results of this analysis revealed that all three subjects achieved mastery of objective one. One subject achieved mastery of objective five, and two subjects achieved mastery of objective six. None of the subjects, however, mastered objectives two, three, four or seven.

Table 2

Percentage of Correct Responses on Pre- and Posttest for the Three Phases of Evaluation

Phases	Ss	Pre-	Post
ONE			
	1	0	58
	2	0	61
	3	6	70
	4	0	46
TWO			
	5	0	72
	6	13	97*
THREE			
	7	25	91*
	8	9	94*
	9	22	100*

Note. * Mastery Learning was achieved.

Table 3

Percentage of Correct Responses for each Instructional Objective on the Posttest for the Three Phases of Evaluation

Objective*		1	2	3	4	5	6	7
	Ss	Posttest						
Phase 1								
	1	50	0	33	75	0	100	83
	2	100	0	33	50	0	57	75
	3	100	0	67	50	100	100	67
	4	100	0	0	75	0	57	50
Phase 2								
	5	0	0	100	50	50	100	100
	6	100	100	100	100	100	100	92
Phase 3								
	7	50	100	67	100	100	100	100
	8	100	100	100	100	100	100	83
	9	100	100	100	100	100	100	100

* The instructional objectives as numbered above were concerned with:

1. definition of adult learner;
2. importances of learner identification;
3. common characteristics of adult learners;
4. adult resistance to learning;
5. components of meaningful learning;
6. learning domains;
7. learning principles.

Learner's Questionnaire. The Learner's Questionnaire documented the comments and feedback of the learners. Reactions were found to be generally positive with regard to major aspects of the training material. The learners perceived the training package as well-organized, useful, interesting and highly educational. The language used, andthe instructions given, were found easy to understand and follow by the learners. All of the learners favored the art-work and visuals included in the presentation.

On the other hand, the voice on the tape was perceived by the learners to be uninteresting and distracting to the learners. The overall pacing of the presentation was perceived to be too fast by all of the subjects. Subjects were also concerned about information overload; there had been too much information given at the beginning and at the end of the presentation.

Also, subjects felt that there had been a major transition from the types of questions asked in the embedded test to the ones on the pre- and posttests. Items on the embedded test seemed to be much easier and more concrete than the items on the pre- and posttests.

Validator's Observer Sheet. The evaluator's observation basically confirmed what was indicated by the learners on the Reactionnaire. Some of the learners directed their inquiries to the evaluator, wondering whether the pre- and the posttest were identical, and whether they were able to take notes while attending the presentation.

Expert Appraisal Report. These reports indicated that

the training material was well designed and well organized. The production aspects of the material were found to be interesting and stimulating.

The pace of the presentation was perceived to be too fast, and it was felt that too much content was being presented at the beginning and at the end of the module. Also, according to the SMEs, there was too large a difference between the difficulty levels of the embedded tests and the pre- and posttests. The embedded tests were too easy, and the pre- and post tests were perceived too difficult.

Revisions

The changes which were made in the training materials included the following:

1. The rate of the presentation was decreased;
2. The front section of the presentation was broken down into more segments. Specifically the concept of the adult learner was presented separately from the concept dealing with the importance of learner identification;
3. The end portion of the presentation was broken done into more segments. Specifically the learning domains were presented separately from the learning principles;
4. The key words and important ideas were further reinforced by adding titles and sub-headings to the visuals related to these ideas. These titles were all highlighted in color and

underlined. Similarly, within the learner's workbook , the important words, names and instructions were highlighted;

5. Extra exercises were added following the new sections of the presentation which were concerned with the concept of the adult learner, the importance of learner identification,the learning domains and the principles of learning.
6. Summaries were added to the end of all sections of the workbook. These summaries reviewed the content covered in the preceding sections;
7. Review questions were added to the end of all sections of the module. These questions asked about the information/content which was covered in the preceding sections;
8. The type of questions on the embedded tests were changed from true/false to fill-in-the blank, matching, and short-answer questions;
9. The type of questions on the pre-and posttest were changed to a combination of short-answer, matching, and fill-in-the-blank.

Phase Two

Results

Pre- and Posttests. The results of the pre- and the posttest were tabulated (see Table 2, p. 39). The pretest scores suggested that all of the subjects could participate in the evaluation of the training material. As the results of post-test revealed, only one subject achieved mastery

learning.

Posttest scores were analyzed per objective (see Table 3, p. 40). According to this analysis one subject achieved mastery learning of objectives one,two,four and,five. All of the participating subjects attained mastery learning of objectives three, six, and seven.

Learner's Questionnaire. The learners commented positively upon most of the aspects of the training package. The learners felt that the lesson was well organized and interesting. The learners believed that they learned a good deal considering the time they had spent on the unit. They found that after taking this unit they were more interested in the subject matter than before taking the unit. While the art-work and design aspects of the training package were highly favored by the subjects, the voice on the tape was, again, found uninteresting. The subjects also suggested that there was more repetition of the important ideas than was required. In addition, the pace of the presentation was still found to be too fast.

Validator's Observation Sheet. The evaluator's observations confirmed the comments made by the learners on the Reactionnaires.

Expert Appraisal Report. The SMEs suggested that the rate of the presentation ought to be decreased and that the voice on the tape should be changed. There was also concern among SMEs that more repetition of the important ideas was required.

Revisions

The following revisions were made in the training material:

1. The rate of the presentation was decreased;
2. The tape was re-recorded using a new voice;
3. Visual summaries in the form of tables and flow-charts were added at the end of each section and an overall review was added to the end of the unit;
4. Important ideas were further reinforced by giving extra examples pertinent to the concepts;
5. The upcoming concepts were introduced to the learner by using advance organizers in the form of a slide which showed the content of presentation with the upcoming concept highlighted in color;
6. Concepts were visually displayed in a more systematic way. For example, the importance of learner identification was presented as a flow-chart and each step in the identification process was presented sequentially.

Phase Three

Results

Pre- and Posttest . The results of the pre- and posttests were tabulated (see Table 2, p. 39). According to the pretest results, all of the subjects were able to take part in the evaluation. The results of the posttest suggested that all of the subjects participating in the

evaluation achieved mastery learning.

The analysis of posttest scores per objective (see Table 3, p. 40) revealed that objectives two, four, five, and six were achieved at mastery level by all the subjects. All of the subjects but one achieved mastery learning of objectives one, and three. Objective seven was achieved by subjects at mastery level, except for one subject.

Learner's Questionnaire. All of the comments given by the learners on the Questionnaire were positive. Learners felt that the amount of information covered in the module was appropriate for the training. They found the voice on the tape, as well as the production and design aspects of the training material, very interesting. Also, the pace of the presentation was perceived to be right. The learners commented that there was adequate repetition of the important ideas. The subjects thought that the posttest questions were well chosen for testing their understanding of the main points in the unit. Learners felt that there was no guessing involved even though there were memory prompts given in some of the questions (for example, in the matching-type questions).

Validator's Observation Sheet. The evaluator's observations of the learners confirmed what the learners had indicated in the Reactionnaires.

Expert Appraisal Report. The SMEs' comments were all positive and in accordance with the learners' comments.

Discussion

This thesis described the production and formative evaluation of a training package. The number of the subjects who participated in the evaluation was limited to a small sample. This was due to practical limitations concerning time, money, personnel, and facilities. The most constraining factor of all was not having enough subjects who would want to participate in the study on a voluntary basis. The training package was continuously revised, based on the results collected from different phases of evaluation. As a result of these revisions significant learning improvements were expected in the performance of the learners on the posttest. As these results indicated, and as the evaluation had suggested, mastery learning was achieved by the learners.

The revisions included changes in the pace and breakdown of the content of the module. It seemed that since the rate of the presentation was too fast (phase one and phase two) the learners did not have enough time to receive, absorb, and recall the information presented to them either completely or accurately. Also, since there was too much information given to the learners at the beginning and at the end of the module (in phase one) learners experienced problems with distinguishing among the different concepts of the module which were presented in the same section. The majority of learners found it difficult to recall the ideas so closely tied and so highly associated with one another (e.g., the definition of adult learner from the importance

of learner identification, or learning domains from the principles of learning). Therefore, the concepts perceived by the learners as similar had to be presented separately.

It seemed that the comprehension and recall of some of the concepts required additional emphasis and a review of these concepts. The revisions included the addition of extra summary sections and extra exercise and review questions to the module. Also, more emphasis was placed on the key words and important ideas from the design and visual points of view. This was done by highlighting and underlining these concepts.

The feedback and comments revealed that learners were experiencing great problems adjusting to the difficulty level of the posttest as compared with the embedded test. This was partially because of the fact that the embedded test items had originally (phase one) consisted of true/false and fill-in-the-blank questions, while the posttest had consisted of short-answer and fill-in-the-blank questions. As a result, answering to embedded tests was much easier (i.e., since they were more cued and also because they allowed for more guessing to occur) for the learners, than answering to the posttest. It was decided, then, to change the type of embedded test items to fill-in-the blank, matching, and short-answer questions. Furthermore, additional questions were added at the end of each embedded test to encourage the learners to do a memory search for the previously learned concepts, and if necessary, to go back and review those concepts.

The voice on the tape (phase one and phase two) was perceived by the learners to be uninteresting and distracting . This was probably due to the fact that the voice belonged to a male authority figure known to the learners. As a result, the tape was re-recorded with a new female voice which was unknown to the subjects.

Moreover, as the results of the posttest revealed (see Table 3) there was a decline in the percentage of the mastery learning achieved by some subjects for a few of the objectives. Therefore, special attention was given to see whether any feedback or information was given by the subjects ,evaluator, or SMEs in relation to these specific objectives. Since no significant finding was discovered in relation to the problem areas, the decline in mastery achievement in these objectives in the later phases was attributed to individual differences in subjects and not to any aspect of design or production of the training package.

Conclusions and Recommendations

In summary, this study suggested the apparent usefulness and effectiveness of the training module. More precisely, continuous selection and utilization of learning and message design principles did have an effect on learning outcomes. Furthermore,the study suggested that through continuous revisions and improvement of the training material, mastery learning was attained by the learners.

This study did not allow for field test and summative evaluation due to the economic and time constraints of CN at the time. It is recommended, however, that this study

be continued upon by conducting a small group field test followed by a summative evaluation in which the final training package can be tested with a larger number of subjects.

Overall, this package is suggested for utilization and implementation in any company and organization such as CN, which may be heavily involved with personnel training.

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APPENDIX A

SOUND/FILMSTRIP SCRIPT

SCRIPT

APPLICATION OF ADULT-LEARNING PRINCIPLES

AV-TC-203.20-1

You should now be looking at the focus frame.Make sure that the picture is centered on the screen, and is in sharp focus.

New business methods and procedures,notably computer technology are constantly changing the face of our operations at CN. To adapt to these changes and to meet employee aspirations we invest time and effort in designing and producing training programs which have been proven themselves in the field. Groups of subject experts,instructional technologists ,and qualified trainers develop and deliver courses on literally hundreds of topics using a variety of techniques. To design the most effective courses possible they combine their efforts in applying sound theoretical principles to our growing needs in adult learning.

This unit will discuss the application of adult learning principles. First, we'll define what we mean by adult learner,then,we will cover the importance of learner identification to you as developers and trainers,and the characteristics common to all adult learners. In the last segments of this unit, we will deal with basic theoretical guidelines, namely,learning domains, and principles of learning. Let's first define who an adult

learner is. We will start with the concept of "adult" itself. Just how do we distinguish between adult and preadult when it pertains to training needs? Basically there are three criteria which help us in describing and defining our adult learner. These criteria are: chronological age, psychological maturity, and social role. The first criterion chronological age, can not adequately qualify an individual as an adult learner. Saying someone is "grown up" or "past school age" is so imprecise it becomes almost meaningless. We all know too well that years alone do not guarantee adult attitudes and responsible behavior. The second criterion psychological maturity, would seem a much more meaningful indicator if only reliable measures of this criterion could be agreed on. We speak of someone "having his head screwed on right" to indicate a mature outlook, but we can hardly make objective distinctions based on such vague, and objective terms. Social role, the third criterion, by far is the most practical standard we can use for defining an adult learner. This criterion, social role, defines an adult learner as one who has entered the stage of life which entails a productive social function together with economic responsibility for oneself and possibly others.

So, to summarize what has been said : While age, psychological maturity and social role all in some way describe the adult learner, it is social role which best serves our purpose of identifying target populations for adult training. The adult learner then is defined

as,someone who has assumed a productive social function and economic responsibility.

It is time now to turn to your workbook and complete exercise one. Stop the machine while doing this, and check your answers on the following page before going on. Stop now.

Let's move on to our next topic learner identification. There are many reasons for the importance of learner identification to trainers and developers of training materials. To start with, learner identification enables us to identify individual differences that exist among learners participating in any training program. For example,two learners in an introductory course in customs can be contrasted to illustrate at least three major categories of individual characteristics. Differences in personal background is the first category to look at. For example, one participant, a high school graduate,brings a couple of years of andirectly related experience in Customs work; while the other learner, a university graduate, has just been promoted to a position requiring knowledge of customs but has no related experience. The two participants, obviously, have different personal backgrounds. Differences in career goals is the second category to look at. Our first learner is, aiming to become a supervisor and eventually, a carload manager. Our other learner, however, plans to pursue a career in customs-related work, perhaps with the government custom agency. Her goal is technical expertise. The two

participants have different career goals. The third learning category of individual differences is learning styles. The first participant learns better from printed material such as written data ,and business forms. The other participant, however, learns best, when, she can visualize detailed information; for example, finding diagrams and illustrations particularly useful. The two learners apparently have different learning styles.

So, to review what was said; There are three distinctive individual differences between learners personal background,career goals, and learning styles. Learner identification enables us to recognize these major individual differences. After individual differences among the learners were identified we can then apply the most effective training methods, and techniques best suited to our identified learners. After the most appropriate training methods and techniques are selected we'll be able to evaluate our training ,and verify whether or not our learns have been correctly identified for any given training program, and then if necessary, readjust our training.

So, let's summarize the importance of learner identification: Learner identification enables any trainer or developer to, first, determine individual differences among the learners; second, to select the best training methods to meet trainees' needs; and, finally, to verify if the learner has been correctly identified.It is time now for the next exercise. Turn to your workbook and complete

exercise two. Stop the machine while doing this and check your answers on the following page before going on. Stop now.

We began this unit with a discussion of how best to distinguish adult learners as a group; the importance of learner identification was discussed next. Let's now look at some characteristics that all adult learners have in common. Identifying the common characteristics in a group of adult learners will lead to more efficiently designed training programs for that group. First of all, adult learners will have certain expectations of the training program that they are receiving. Therefore it is essential to ensure that, there is a basic agreement between these expectations, and our training objectives. You should present the course objectives to the trainees and give them a chance to express what they want before starting in on the content. If we have properly identified our learners and designed the program accordingly relating our objectives to learner expectations should pose no major problem. A well designed learning program should relate our training objectives to the learners expectations. The second major characteristic adult learners have in common is their resistance to learning. Let's explore the wall of resistance that adults may have built. We can cite four major reasons for some adult learners' building up resistance to learning. Firstly, there's the problem of adults unnecessarily having learned the same things over and over again. We call this overlearning. Secondly, adult

learners have the tendency to ingrain and reinforce these previous patterns of behavior. They have a tendency to rationalize and commit themselves to these patterns emotionally, as well as, intellectually. Therefore, they resist new learning. Then there is the perceived risk involved in changing our behavior. Many adults tend to tell themselves that, however outdated or imperfect their ways may be they are known quantities and have served them well enough until now, so why to take risks? Finally, new learning often conflicts or runs counter to what was previously learned. The potential conflict between new and old procedures or techniques is another factor which increases resistance to learning. Formidable though it may be, this resistance is by no means insurmountable. The challenge is to motivate adult learners to explore new ways of doing things without abandoning their confidence in past experience but rather by applying that experience in new contexts which incorporate improved methods. As instructional designers or trainers we must be aware of the resistance and work at breaking it down. To break this resistance we must design our training so that, adult learners start off with the feeling that, they'll be achieving their own goals. If we can show them that our programs are aimed at their goals, then our training will be right on target.

Let's take a moment to review what was said. The common characteristics of adult learners are as follows: The adult learner has expectations. We must reassure our

trainees so that, our training objectives correspond to their expectations. Adult learners resist learning because: First,most of their learning is overlearning.Second, they rationalize a commitment to their old ways.Third, they fear the risks of change, and finally they may be confused by the apparent conflict between old, and new learning. One way of breaking this resistance down is by relating our training to the learner's own past experiences and present goals.

It is time now for another exercise. Please turn to your workbook and complete exercise three. Stop the machine while you do this. Restart after you have checked your answers. Stop now.

Let's now look at our next topic, learning domains. For any training to be effective, it cannot be aimed at just one kind of learning. We must deal with all major categories - including attitudes, knowledge and skills- called learning domains. The three learning domains are: affective,cognitive, and psychomotor. The affective domain concerns the learner's attitudes, interests ,and values. Training objectives in this category would be those which foster positive feelings about oneself and a constructive disposition toward work. An obvious example would be the fostering an attitude of respect and courtesy in a customer relations function. Recognizing the importance of handling dangerous commodity documentation is another example of an objective in the affective domain. The cognitive domain, includes reasoning and, problem-

solving skills along with other mental abilities. A good example might be learning to apply the input requirements for way-billing.Learning to recognize and identify the various information and data that appear on the JF Assessment Report is another of training objectives dealing with the cognitive domain. The third domain of learning, the psychomotor domain,deals with skills involving physical coordination and manual dexterity. This includes anything from correct lifting techniques to, keyboard manipulation.A training objective of this domain, for example, would be acquiring the skills of handling and operating a fire extinguisher.

To review what was said, three domains of learning consist of : cognitive, dealing with knowledge and mental skills; affective, dealing with values,attitudes and feelings, and; psychomotor dealing with physical activities and fine manipulations.

It's time to do the exercises now.Please turn to your workbook.and complete exercise four. Leave the machine off when you do this. Restart it after you have checked your answers. Stop now.

Now that we have defined learning domains, let's discuss the fundamentals that, we should follow in designing and delivering training or the so called principles of learning. The first learning principle is the principle of readiness. Simply stated,readiness means that, training is more successful when, the learner is ready and willing. A volunteer in a training program, for example,

will likely learn more than, someone,forced into it. The second principle of learning is, the familiar principle of exercise, or "practice makes perfect.".Repeating an action allows us to master it, retain it ,and build on it.The third principle, the principle of effect states that, more learning occurs when the learner is rewarded by some satisfying condition.Offering promotion is an obvious way of motivating trainees. Also, other types of reinforcement such as,pleasant surroundings and positive feedback can be built into training to achieve significant learning effects. The principle of accuracy, the fourth principle, implies that, the trainee should learn the right way the first time ,and be coached thoroughly to ensure maintenance and continuation of correct behavior. The fifth principle, the principle of recency states that, we remember best what we have learned more recently. This means careful attention should be given to the sequence of training content, and prerequisite material before moving on to new learning. Finally, the principle of intensity recognizes that, we learn more from the realistic simulations than from abstract examples. As we all know learning from experience leaves the most intense impression.

Briefly then,the six principles of learning are: First, readiness,or the pre-disposition to learn; Second,exercise,or learning through repetition; Third,effect,or motivating the learner by reinforcement; Fourth accuracy,or learning the correct way and being

coached throughout; Fifth recency, or remembering best what we learned most recently; and finally, intensity or learning most from the real thing.

Please turn to your workbook now, and complete exercise five. Stop the machine while you do this.Stop now.

In this unit we have looked at: application of adult-learning theories which guide us in designing and delivering effective training. We've identified just what distinguishes "adult" learners as a group; What characteristics they all share in common; and, what important individual differences they possess. We also looked at the importance of learner identification. The final two sections defined the three learning domains ,and the six principles of learning. These fundamental concepts have proven to be of practical value to those of us who develop and deliver the many training programs for CN employees.

It is only by applying sound theory to actual practice that, we can maintain our high standards. In a word then, this unit helps us to know who our learners are; what special demands and characteristics they share; and what principles we can apply in designing their training.

We've come to the end of this unit. Please re-read the summary sheet at the end of each exercise in the workbook before taking the posttest. This concludes this unit on the application of adult-learning principles.In preparation for the next trainee,please rewind the tape and filmstrip.Thank-you.

APPENDIX B

LEARNER'S WORKBOOK

Note: Some of the materials found in the following Appendices have been reformatted, retyped ,or reduced to confirm with the margin size requirements of the Graduate Studies Office.

WORKBOOK

AV-TC-203.20-1

APPLICATION OF ADULT-LEARNING PRINCIPLES

UNIT CONTENT

This unit introduces various concepts related to adult learning, and explains their "application" to the design and delivery of training for adults.

CN TRANSPORTATION

READ THIS FIRST

INSTRUCTIONS FOR USING THIS TRAINING MODULE

PREPARATION

You need:

a) Workbook
b) Cassette & Filmstrip
c) Projector

REFERENCE

For general notes on self-instruction, and operating instructions for the audio-visual hardware, ask your Advisor for loan of the Trainee's Guide to Self-Instruction.

PROCEDURE

Follow these steps:

1. Make sure that both copies of the Advisor's Report on Self-Instruction Training have been removed from the back of this workbook by your Advisor.
2. Remove the Self-Instruction Training Log from the back of the workbook. Record on this form the time you spend on this module.
3. Read the Objectives (on facing page) to acquaint yourself with the intent of this module.
4. Remove the Pre-Test (yellow pages) from the back of the workbook. Complete it, and give it to your Advisor for marking.

   Do not go beyond this step until instructed to do so by your Advisor
5. Study the module. On completion, review all exercises.
6. Remove the Post-Test from the back of the workbook. Complete it, and give it to your Advisor for marking.
7. Return the completed Self-Instruction Training Log, and all reusable equipment and material to your Advisor.
8. If you wish to comment on any of this training material, remove the confidential Trainee's Comments form from the back of the workbook. Complete it, and put it in the railway mail.

START NOW

APPLICATION OF ADULT LEARNING PRINCIPLES

OBJECTIVE

After studying this unit, you will be able to:

1. Define adult learner;
2. State the importance of learner identification to trainers and developers of instructional material;
3. List and identify common characteristics of all adult learners in training situations;
4. Name the components of meaningful learning;
5. Name and discriminate between the three different learning domains.
6. Name and discriminate between the six principles of learning.

START THE TAPE NOW

EXERCISE NO.1

CONCEPT OF ADULT LEARNER

For Question 1

Circle "T" (TRUE) or "F" (FALSE) to indicate whether or not each of the following statements is correct:

1. "Adult" Learner" is defined as:

T F a) someone who has reached a certain age, for example, eighteen years old.

T F b) someone who has reached a certain stage of Psychological maturity.

T F c) someone who has attained certain social roles.

For Questions 2,3

Complete the statements by filling in the blanks:

2. Using social role as the criterion, "adult learner" is defined as the one who has entered the stage of life which entails a a)_____ _____ function, together with b)_____ _____ for oneself and possibly others.

CHECK YOUR ANSWERS ON THE NEXT PAGE

ANSWERS FOR EXERCISE NO. 1

- REMOVE THIS PAGE FROM THE WORKBOOK
- CORRECT YOUR ANSWERS
  - The correct answers are on the back of this page
  - Stroke out your errors
  - Write in corrections
    (USE A DIFFERENT COLOURED PEN TO WRITE IN YOUR CORRECTIONS. IT WILL HIGHLIGHT WHERE YOU NEED THE MOST REVIEW).
- RESTART TAPE
- DISCARD THIS PAGE WHEN YOU ARE FINISHED

ANSWERS FOR EXERCISE NO. 1

1. a) FALSE — chronological age cannot adequately qualify an individual as an adult.

   b) FALSE — psychological maturity is not an adequate indicator of adulthood, since reliable measures of this criterion are difficult to agree on.

   c) TRUE — social role is by far the most practical standard we can use in distinguishing "adult learners".

2. (order is important)

   a) PRODUCTIVE SOCIAL

   b) ECONOMICAL RESPONSIBILITY

READ THE SUMMARY
ON THE FOLLOWING PAGE

SUMMARY NO. 1

Adult learner is the learner who has attained two roles/functions:

- productive social function
- economic responsibility

RESTART THE TAPE

EXERCISE NO. 2

LEARNER IDENTIFICATION

For Question 1 and 2

Complete the statement by filling in the blanks:

1. Any two adults in a training program could have many different individual characteristics. As developers and trainers, we should be concerned with differences in learner's a)_____ _____, b)_____, and c)_____ _____.

2. Learner identification is important to all trainers and developers for many reasons. Learner identification enables you to determine the existing a)_____ _____ among your learners, b) to select the most effective _____ _____ best suited to your learners, and to c)_____ whether or not your learners have been correctly identified in the first place.

CHECK YOUR ANSWERS
ON THE NEXT PAGE

ANSWERS FOR EXERCISE NO. 2

- REMOVE THIS PAGE FROM THE WORKBOOK
- CORRECT YOUR ANSWERS
  - — The correct answers are on the back of this page
  - — Stroke out your errors
  - — Write in corrections
    (USE A DIFFERENT COLOURED PEN TO WRITE IN YOUR CORRECTIONS. IT WILL HIGHLIGHT WHERE YOU NEED THE MOST REVIEW).
- RESTART TAPE
- DISCARD THIS PAGE WHEN YOU ARE FINISHED

ANSWERS FOR EXERCISE NO. 2

1. (order is not important)

   a) LEARNING STYLES

   b) PERSONAL BACKGROUND

   c) CAREER GOALS

2. (order is important)

   a) INDIVIDUAL DIFFERENCES

   b) TRAINING METHODS

   c) VERIFY LEARNERS

SUMMARY NO. 2

Learner Identification a very important part of all training programs, enables developers and instructors to:

.determine individual differences

.select best training methods

.verify learners

RESTART THE TAPE

EXERCISE NO. 3

COMMON CHARACTERISTICS OF ADULT LEARNERS

For question 1

Indicate whether or not each of the following phrases is a suitable completion for the statement by circling either "T" (TRUE) or "F" (FALSE).

1. Adult learners have common characteristics. In general:

   T F a) adult learners have certain expectations, and these expectations should be dealt with before starting the training program.

   T F b) basic agreement between learner's expectations and our training objectives is not necessary.

For Questions 2 to 6

Complete the statements by filling in the blanks.

2. Resistance to learning is common among all adult learners. Adults resist learning because of:

   a)_____ which is learning the same things over and over again; b) _____ involved in changing their old behaviors; potential c)_____ between new and old learning, and d)_____ their previous patterns of behavior.

3. Trainers and developers can overcome resistance to learning by relating the training program to learner's own a)----------, and b)_____.

4. Adult learner is defined as:

   _____

   _____.

EXERCISE NO. 3 is continued on the next page.....

5. Learner identification is an important aspect of any training program. Through this process the trainer or developer can:

a) _____

b) _____

c) _____

6. The important categories of individual differences among adult learners are:

a) _____ _____

b) _____ _____

c) _____ _____

CHECK YOUR ANSWERS
ON THE NEXT PAGE

ANSWERS FOR EXERCISE NO. 3

- REMOVE THIS PAGE FROM THE WORKBOOK
- CORRECT YOUR ANSWERS
  - The correct answers are on the back of this page
  - Stroke out your errors
  - Write in corrections
    (USE A DIFFERENT COLOURED PEN TO WRITE IN YOUR CORRECTIONS. IT WILL HIGHLIGHT WHERE YOU NEED THE MOST REVIEW).
- RESTART TAPE
- DISCARD THIS PAGE WHEN YOU ARE FINISHED

ANSWERS FOR EXERCISE NO. 3

1. a) TRUE — Expectation of adult learner should be dealt with at the beginning of each training program.

2. b) FALSE — There must be basic agreement between adult learner's expectation and training objectives of any program.

3. (order is important)

   a) OVERLEARNING

   b) RISKS

   c) CONFLICT

   d) RATIONALIZING

3. (order is not important)

   a) GOALS

   b) EXPECTATIONS

4. SOMEONE WHO HAS ATTAINED A PRODUCTIVE SOCIAL ROLE ALONG WITH ECONOMIC RESPONSIBILITY FOR ONESELF AND POSSIBLY OTHERS.

5. (order is not important)

   a) LEARNING STYLES

   b) CAREER GOALS

   c) PERSONAL BACKGROUND

6. (order is important)

   a) DETERMINE INDIVIDUAL DIFFERENCES

   b) SELECT BEST TRAINING METHODS

   c) VERIFY LEARNERS

SUMMARY NO. 3

Adult learners share certain common characteristics.

Adult learners:

.have expectations

.resist learning

Adults resist learning due to four basic reasons:

.most of adult learning is overlearning

.learning involves taking risks

.new learning may conflict or run counter to old learning

.old learning is rationalized and therefore hard to be changed

---

Resistance to learning could be overcomed ,and learners can be motivated by relating the training directly to the learner's own:

.experiences

.goals

RESTART THE TAPE

EXERCISE NO. 4

LEARNING DOMAINS

For Questions 1 & 2

Complete the statements by filling in the blanks.

1. The three learning domains are:

   a) _____

   b) _____

   c) _____

2. Each of the following statements describes one of the three domains of learning. Beside each statement, write the name of the domain described.

   a) _____ acquiring the manual dexterity to operate a typewriter.

   b) _____ determining and applying the appropriate waybill number for all situations.

   c) ---------- identifying between the different types of customs manifest.

CHECK YOUR ANSWERS
ON THE NEXT PAGE

ANSWERS FOR EXERCISE NO. 4

- REMOVE THIS PAGE FROM THE WORKBOOK
- CORRECT YOUR ANSWERS

— The correct answers are on the back of this page

— Stroke out your errors

— Write in corrections
(USE A DIFFERENT COLOURED PEN TO WRITE IN YOUR CORRECTIONS. IT WILL HIGHLIGHT WHERE YOU NEED THE MOST REVIEW).

- RESTART TAPE
- DISCARD THIS PAGE WHEN YOU ARE FINISHED

ANSWERS FOR EXERCISE NO. 4

1. (order is not important)

   a) COGNITIVE

   b) PSYCHOMOTOR

   c) AFFECTIVE

2. a) PSYCHOMOTOR deals with physical coordination and manual dexterity;

   b) AFFECTIVE deals with mental abilities

   c) COGNITIVE deals with mental abilities

READ THE SUMMARY
ON THE FOLLOWING PAGE

SUMMARY NO. 4

The three learning domains are:

.cognitive- dealing with knowledge and mental skills;

.affective- dealing with values, and feelings;

.psychomotor- dealing with physical activities and manual dexterity

---

RESTART THE TAPE

EXERCISE NO. 5

For Questions 1 & 2

Complete the statements by filling in the blanks.

1. The six principles of learning are called, principles of:

   a) _____

   b) _____

   c) _____

   d) _____

   e) _____

   f) _____

2. The following are the definitions of principles of learning. Beside each definition, write the name of the principle related to it.

DEFINITION	PRINCIPLE (NAME)
a) Teach the right way the first time and give continuous feedback.	_____
b) Learning should be rewarded.	_____
c) Learning is more effective when the learner is ready and willing.	_____
d) The more recent the learning, the better it is remembered.	_____
e) Learners learn more from actual, or realistic situations.	_____
f) Practice makes perfect.	_____

EXERCISE NO. 5 is continued on the reverse.....

3. Give names of three learning domains and define each one briefly.

a) _____ Deals with _____

b) _____ Deals with _____

c) _____ Deals with _____

d) _____ Deals with _____

CHECK YOUR ANSWERS
ON THE FOLLOWING PAGE

ANSWERS FOR EXERCISE NO. 5

- REMOVE THIS PAGE FROM THE WORKBOOK
- CORRECT YOUR ANSWERS
  - — The correct answers are on the back of this page
  - — Stroke out your errors
  - — Write in corrections
    (USE A DIFFERENT COLOURED PEN TO WRITE IN YOUR CORRECTIONS. IT WILL HIGHLIGHT WHERE YOU NEED THE MOST REVIEW).
- RESTART TAPE
- DISCARD THIS PAGE WHEN YOU ARE FINISHED

ANSWERS FOR EXERCISE NO. 5

1. (order is not important)
   a) EFFECT
   b) RECENCY
   c) INTENSITY
   d) READINESS
   e) EXERCISE
   f) ACCURACY

2. (order is important)
   a) ACCURACY
   b) EFFECT
   c) READINESS
   d) RECENCY
   e) INTENSITY
   f) EXERCISE

3. (order is not important)
   a) PSYCHOMOTOR- deals with skills involving physical coordination and manual dexterity
   b) AFFECTIVE- deals with the learner's attitudes, interests, and values
   c) COGNITIVE- deals with reasoning and problem-solving skills along with other mental abilities

---

READ THE SUMMARY ON THE FOLLOWING PAGE

SUMMARY NO. 5

The six learning principles are:

.RECENCY - we remember best what we learned most recently

.READINESS -training is most successful when the learner is ready and willing to learn

.EXERCISE - practice makes perfect

.EFFECT - learning occurs when the learner is rewarded by some satisfying condition

.ACCURACY - the trainee should be taught the right way the first time

.INTENSITY - we learn more from the real thing or realistic simulations, than from an abstract situation

---

RESTART THE TAPE

PRE-TEST

CET-2 5/82

APPLICATION OF ADULT-LEARNING PRINCIPLES

CC 1 5 Page 1 of 4

CC 9 AV-TC-203.20-1

Name:

Issue CC 20 1 Version CC 21

PIN CC 22

Date CC 28 MO DAY YR

For Questions 1 to 7

Complete the following statements by filling in the blanks.

1. Adult training defines "adult learner" as a person who has, at least, attained two social roles/functions. These roles are:

CC 34 1 X a)

1 X b)

2. Learner identification enables developers and instructors to:

1 X a)

1 X b)

1 X c)

3. Adult learners are not all the same. Participants in any training program may have individual differences in at least three main categories. The learners may differ in:

1 X a)

1 X b)

1 X c)

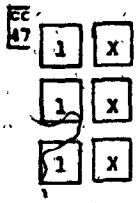
4. Adults' resistance to learning, in general, occurs due to four basic reasons:

1 X a)

1 X b)

1 X c)

1 X d)

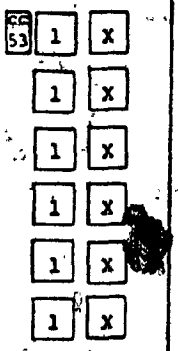


5. The three basic Learning Domains are called:

   a) which includes reasoning, problem-solving, and other mental abilities

   b) which includes skills involving physical coordination and manual dexterity

   c) which deals with values, attitudes, and feelings



6. The six Principles of Learning are named, principle of:

   a)

   b)

   c)

   d)

   e)

   f)

7. Resistance to learning could be overcome by designing and conducting training programs which are directly related to learners' own:

   a)

   b)

Questions 8 & 9

In the box beside the statement in Column 1, write the letter corresponding to the best answer from Column 2.

8. The following are names and examples of different learning domains. Match the correct name with its related example(s).

	COLUMN 1		COLUMN 2
	Example		Name (of Domain)
CC 58 ☐	a) memorizing the codes associated with various special commodities	A	AFFECTIVE
☐	b) learning the marshalling rules associated with dangerous commodity documentation	B	AUDITORY
☐	c) improving attitudes towards the value of meeting our customers' needs	C	COGNITIVE
		D	PSYCHOMOTOR
		E	SENSORY

CST-3
11/83

9. The following are definitions and names of the six principles of learning. Match the names of the principle to its correct definition.

	COLUMN 1 Definition	COLUMN 2
CC 51	a) training is more successful when the learner is ready and willing	A INTENSITY
	b) things most often repeated are best remembered	B AWARENESS
	c) learner learns more from the real thing or realistic simulations	C EXERCISE
	d) more learning occurs when the learner is rewarded by some satisfying condition	D READINESS
	e) we remember best what we learned most recently	E INTELLIGENCE
	f) the learner should learn the right way the first time	F RECENCY
		G ACCURACY
		H EFFECT

Maximum Score 12 Total Score CC 70 [ ][ ] % CC 80

Note: Normally, the advisor will discuss with the Trainee and correct errors made on the Post-Test only.

However, if a pass is attained on the Pre-Test and the Trainee will not be completing the training unit, then the advisor must discuss correct answers to the errors made on the Pre-Test.

POST-TEST

CST-2
3/82

APPLICATION OF ADULT-LEARNING PRINCIPLES

cc 1 5 Page 1 of 4

cc 2 AV-TC-203.20-1

Name:

Issue cc 20 1 Version cc 21

PIN cc 22

Date cc 23 MO DAY YR

For Questions 1 to 7

Complete the following statements by filling in the blanks.

1. Adult training defines "adult learner" as a person who has, at least, attained two social roles/functions. These roles are:

cc 34 1 X

a)

1 X

b)

2. Learner identification enables developers and instructors to:

1 X

a)

1 X

b)

1 X

c)

3. Adult learners are not all the same. Participants in any training program may have individual differences in at least three main categories. The learners may differ in:

1 X

a)

1 X

b)

1 X

c)

4. Adults' resistance to learning, in general, occurs due to four basic reasons.

1 X

a)

1 X

b)

1 X

c)

1 X

d)

EC 47 1 X
1 X
1 X

5. The three basic Learning Domains are called:

a) which includes reasoning, problem-solving, and other mental abilities

b) which includes skills involving physical coordination and manual dexterity

c) which deals with values, attitudes, and feelings

EC 53 1 X
1 X
1 X
1 X
1 X
1 X

6. The six Principles of Learning are named, principle of:

a)

b)

c)

d)

e)

f)

1 X
1 X

7. Resistance to learning could be overcome by designing and conducting training programs which are directly related to learners' own:

a)

b)

Questions 8 & 9

In the box beside the statement in Column 1, write the letter corresponding to the best answer from Column 2.

8. The following are names and examples of different learning domains. Match the correct name with its related example(s).

	COLUMN 1		COLUMN 2
	Example		Name (of Domain)
EC 58	a) memorizing the codes associated with various special commodities	A	AFFECTIVE
		B	AUDITORY
	b) learning the marshalling rules associated with dangerous commodity documentation	C	COGNITIVE
		D	PSYCHOMOTOR
	c) improving attitudes towards the value of meeting our customers' needs	E	SENSORY

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9. The following are definitions and names of the six principles of learning. Match the names of the principle to its correct definition.

Definition	COLUMN 2
a) training is more successful when the learner is ready and willing	A INTENSITY
b) things most often repeated are best remembered	B AWARENESS
c) learner learns more from the real thing or realistic simulations	C EXERCISE
d) more learning occurs when the learner is rewarded by some satisfying condition	D READINESS
e) we remember best what we learned most recently	E INTELLIGENCE
f) the learner should learn the right way the first time	F RECENCY
	G ACCURACY
	H EFFECT

CC 51 [ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Maximum Score 32 Total Score CC 77 0 [ ] [ ] % CC 80 [ ]

Note: Normally, the advisor will discuss with the Trainee and correct errors made on the Post-Test only.

However, if a pass is attained on the Pre-Test and the Trainee will not be completing the training unit, then the advisor must discuss correct answers to the errors made on the Pre-Test.

LEARNER DATA SHEET

Name_____

Date_____

Department_____

Position_____

Age_____ Sex_____ CN Service Date_____

Mother Tongue_____ Other Languages_____

Education: (circle last year of schooling completed)

6 7 8 9 10 11 12 13 14 15

16 17

Type of Highschool Course: (circle)

Academic/General Technical Commercial Other

Name of College/University attended:_____

Major_____

Minor_____

Other Schooling/Courses: (please specify)

Employment/Work History: (state briefly positions held and duration)

Have you ever used any type of self-instructional material?

If yes, what was it and who long ago?

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STUDENT REACTIONNAIRE

Name _____ Date _____

Unit Title APPLICATION OF ADULT-LEARNING PRINCIPLES Unit No. AV-TC-203.20-1

We would appreciate your honest comments regarding the unit you have just completed. Your evaluation of the unit will help us identify and correct problems you may have encountered.

Key: Circle the answer which most closely corresponds to your feelings about the corresponding statement.

SA means you strongly agree; A means you agree; U means you are uncertain; D means you disagree; and SD means you strongly disagree.

1)	I had enough background knowledge to prepare me for this unit.	SA	A	U	D	SD
2)	I was often confused as to what, exactly, I was supposed to be learning.	SA	A	U	D	SD
3)	The unit was often boring.	SA	A	U	D	SD
4)	The lesson was very well organized. The concepts were highly related to each other.	SA	A	U	D	SD
5)	There was too much content in this unit.	SA	A	U	D	SD
6)	There was enough repetition of important ideas.	SA	A	U	D	SD
7)	The main points were illustrated with excellent examples.	SA	A	U	D	SD
8)	I often did not understand what was going on because the vocabulary contained many unfamiliar words.	SA	A	U	D	SD
9)	The Post Test questions did a good job of testing my knowledge of the main points in the unit.	SA	A	U	D	SD
10)	Much of the work I was asked to do (exercises, etc.) seemed to be needless.	SA	A	U	D	SD

.....2

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11)	After taking the unit, I was still confused about many things and I did a lot of guessing on the Post Test questions.	SA	A	U	D	SD
12)	I believe I learned a lot considering the time I spent on the unit.	SA	A	U	D	SD
13)	I think that the unit needs to be greatly improved before it can be used with other students.	SA	A	U	D	SD
14)	After taking the unit, I was more interested in and/or favourably impressed with the subject matter than I was before taking the unit.	SA	A	U	D	SD
15)	I was personally very interested in the unit's objectives.	SA	A	U	D	SD
16)	I was often bored when listening to the tapes and watching the filmstrip.	SA	A	U	D	SD
17)	The workbooks were well designed. I could easily follow the instructions and perform the exercises.	SA	A	U	D	SD
18)	Often, the tape and slides seemed unrelated to each other.	SA	A	U	D	SD
19)	The rate of presentation was too fast.	SA	A	U	D	SD
20)	The rate of presentation was too slow.	SA	A	U	D	SD
21)	The artwork was very good.	SA	A	U	D	SD
22)	The voice on the tape was very interesting.	SA	A	U	D	SD
23)	Write below any suggestions or changes that you believe will improve the unit.					

APPENDIX C

INSTRUCTOR'S GUIDE

VALIDATOR'S OBSERVER SHEET

Unit: AV-TC-203.20-1

APPLICATION OF ADULT LEARNING PRINCIPLES

Candidate _____

Validator _____

Date _____

page _____ of _____

Frame# Reference	Remarks Questions	Feedback/ Recommendations

CHAPTER: Advisor's Notes

Unit: AV-TC-203.20-1

TOPIC: Application of Adult-learning Principles

A. **Unit Content**

This unit is intended to provide guideline on application of adult-learning principles.

B. **Learner Characteristics**

This uit is principally directed to those employees whose duties occasionally require them to develop training units (e.g., developers), and give training courses (e.g., instructors).

C. **Duration of Training**

This unit should take the following approximate times:

Pretest - 10 minutes

Training _ 45 minutes

Posttest _ 20 minutes

D. **Test Scores**

Pass mark on the test is 29 (maximum 32). Review any error.

E. **Marking Guide**

Allow 1 mark for each part of the following questions which has been correctly answered.

Question 1

The missing words in any order are:

a) PRODUCTIVE SOCIAL FUNCTION

b) ECONOMIC RESOPNSIBILITY

Question 2

The missing words in the following order are:

a) IDENTIFY INDIVIDUAL DIFFERENCES

b) SELECT TRAINING METHODS

c) VERIFY LEARNERS

Question 3

The missing words in any order are:

a) LEARNING STYLES

b) CAREER GOALS

c) PERSONAL BACKGROUND

Question 4

The missing words in any order are:

a) OVERLEARNING

b) RISK

c) CONFLICT

d) RATIONALIZING

Question 5

The missing words are in the following order:

a) COGNITIVE

b) PSYCHOMOTOR

c) AFFECTIVE

Question 6

The missing words in any order are:

a) EFFECT

b) RECENCY

d) EXERCISE

e) READINESS

f) INTENSITY

g) ACCURACY

Question 7

The missing words in any order are:

a) EXPERIENCE

b) GOALS

QUESTION 8

The correct matches are:

a) with D

b) with C

c) with A

Question 9

The correct matches are:

a) with D

b) with C

c) with A

d) with H

e) with F

f) with G

Maximum Mark = 32